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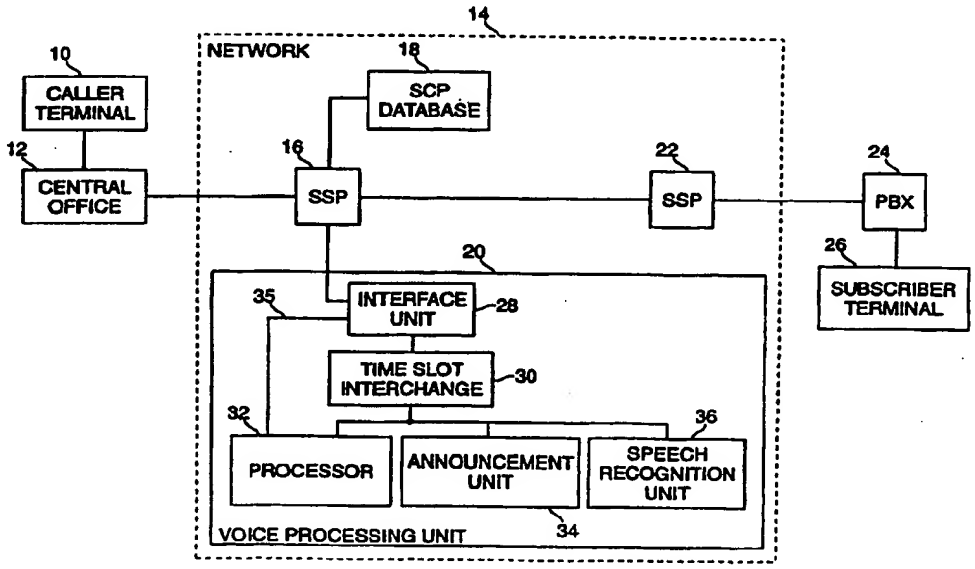

(57) Abstract

A method and apparatus for preselecting a language for interactive telecommunication services. A language selection indicator for a particular system user (10, 26) is stored in a telecommunication system storage means (18), such that the language selection may be identified as associated with the user. Each time the user accesses the telecommunication system, the stored language selection indicator is identified using a user identifier. All subsequent interactive services are then provided to the user in the preselected language. The present invention may be used in telephone systems with a calling line identifier (CLI) or a telephone credit card number as a user identifier. The invention may also be used in data communication applications, such as automatic teller machine (ATM) networks.

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FLEXIBLE LANGUAGE SELECTION IN A TELECOMMUNICATION SYSTEM

FIELD OF THE INVENTION

The present invention relates generally to improvements in telecommunication services and systems. More particularly, the present invention relates to techniques for permitting telecommunication system users to select a desired language for conducting interactive services.

DESCRIPTION OF PRIOR ART

Interactive services in a telecommunication system are typically provided in a single system language such as, for example, English for systems serving users in the U.S. The interactive services may be provided by recorded announcements, information screens, or live operators. Examples of telecommunication systems with interactive services include long-distance telephone networks and automatic teller machine (ATM) networks. A significant problem with interactive services is that many of the system users may not have sufficient proficiency in the single system language to effectively utilize the interactive system features.

One currently available technique allows the users to select from one of several available languages when accessing the system. For example, at many ATM machines in the U.S., a user is prompted to select whether subsequent announcements, or information screens, should be provided in English or Spanish. However, this approach usually requires the user to re-enter his preference each time the system is accessed, despite the fact that the user's preference is unlikely to change with each access, and is thus inefficient and a potential source of aggravation to the user.

In certain telephone networks, a user may select a language by dialing one of a number of different network

access numbers. For example, calling card services in some long-distance carrier networks are accessed via a toll-free number, rather than automatically upon dialing "0" followed by a destination Plain Old Telephone Service (POTS) number. Because the user has to enter an access number to receive calling card services, the long distance carrier may simply assign a different access number for each of the available interactive service languages. Users accessing the network with a particular toll-free number receive interactive services in the corresponding language. However, by entering the toll-free number each time, the users are, in effect, reselecting a language preference with every network access. The network is unable to determine the user's language preference without first receiving the user-entered access number.

Another approach, utilized in telephone networks by Executive Telecard International (ETI), provides interactive services in the language of a credit card issuer through which the user bills telephone calls. Each credit card issuer is generally associated with a single language based upon the country in which the issuer is located. For example, users with cards issued by First Card AB will receive interactive services in Swedish, while users with cards issued by Eurocard Danmark will receive interactive services in Danish. A central database in the ETI system stores information identifying a single language associated with each of the card issuers, and determines the user's credit card issuer based upon the credit card number entered when a user accesses the system. See ETI Form 10-K, filed with the U.S. Securities and Exchange Commission for the fiscal year ended March 31, 1992, pp. 6-10. However, this approach is inflexible in that only a single language is associated with each card issuer, and there is generally no language distinction made between different users with

the same card issuer. A user will therefore have to change to a card issuer in another country in order to receive interactive services in a different language.

An alternative language selection technique, disclosed in Japanese Laid-Open Patent 62-34448, controls an operator display board in a telephone system based upon stored language information for the various telephones in the system. However, the language information is not processed to route incoming calls or provide appropriate announcements, but instead is displayed to an operator, who generally must be co-located with the display in order to properly respond to the user. The language selection is not based upon a generic user identifier, such as a telephone calling line identifier (CLI), which may be readily passed through a switching network and processed at a variety of different switching points. As a result, telephone systems using this technique are inflexible and inefficient, and do not provide adequate language selection capabilities to the system users.

Another available technique, disclosed in Japanese Laid-Open Patent 04-319849, utilizes an announcement reproducing unit at a user's telephone. The reproducing unit stores messages in several different languages, and reproduces a particular stored message in response to a message identification number transmitted from a telephone exchange. The user selects a particular language in which to receive an announcement by altering the state of a switch in the reproducing unit. There is no central storage of information regarding the user's language selection, and the user can only receive announcements in the selected language from a telephone attached to and co-located with the reproducing unit. Furthermore, this approach involves the prohibitively high expense of equipping each user telephone with an announcement reproducing unit.

As is apparent from the above, a need exists for efficient and flexible language selection in a telecommunication system, which does not require users to re-select a language upon each system access, does not unduly restrict user language selection, and does not require additions to or modification of user equipment.

SUMMARY OF THE INVENTION

The present invention provides a method and apparatus for flexible language selection in a telecommunication system. The present invention involves storing a language selection indicator, preselected by a particular system user, in a telecommunication system database or other storage means. The language selection may be stored with a corresponding user identifier such that the language selection may be identified as associated with the particular user. Each time the user accesses the telecommunication system, the user identifier may, for example, be sent to a system database to determine the user's language selection. All subsequent interactive services are then provided to the user in the preselected language.

In accordance with one aspect of the present invention, a language selection method is provided which includes the steps of storing, in a telecommunication system storage means, a language selection indicator for a particular system user; identifying the language selection indicator stored in the storage means, upon access to the system by the user, using a user identifier corresponding to the user; and providing subsequent interactive services to the user, such as prompting announcements and operator assistance, in a preselected language corresponding to the language selection indicator.

In accordance with another aspect of the present invention, the flexible language selection may be

implemented in a telephone network. A call is received in a central office and routed to a first network switch. The network switch determines a calling line identifier (CLI) corresponding to the telephone line on which the call is made, and provides the CLI to a network database. The CLI is used to locate, within the network database, a language selection indicator associated with the telephone line from which the call was made. The language selection indicator may then be provided to, for example, a processor and an announcement unit for determining and generating announcements in the appropriate language. The language selection indicator may also be used to route the call to an operator familiar with the preselected language.

In accordance with an additional aspect of the present invention, the language selection indicator of a particular caller may be identified using the user's telephone credit card number. At a caller terminal, such as a public telephone, a card reader reads the credit card number or the number is entered using, for example, voice or dual-tone multiple-frequency (DTMF) entry commands. The card number is provided, via the connection established between a central office and a network switch, to a network database in which the language selection indicators are stored.

In accordance with a further aspect of the present invention, flexible language selection may be implemented in a data communication system, such as an ATM network. The user identifier is read from a user access card at an ATM card reader, and transmitted through a data link to a network database which stores the language selection indicators. The interactive services at the ATM are then provided in the preselected language after the language indicator is transmitted to the ATM through the data link.

As a feature of the present invention, information

regarding a user's language selection is stored within a telecommunication system database or other storage means such that it may be efficiently retrieved each time the user accesses a system terminal. The system automatically responds in the preselected language based upon a user identifier, such as a calling line identifier (CLI) or a telephone credit card number in a telephone network. A caller at a telephone terminal, or a customer at a network ATM, therefore need not waste time repeatedly re-selecting a preferred language each time the network is accessed.

As another feature of the present invention, the language selection of the user is not restricted to, for example, the language of a credit card issuer through which the user is billing calls. Each user can generally select from among each of the languages stored within the system, regardless of the user's physical location.

As an additional feature of the present invention, the selected language is centrally stored, and all announcement generation may be performed, for example, within a telephone switching network rather than at a user telephone terminal. It is therefore no longer necessary for a local attendant or operator to analyze the language selection information in order to determine an appropriate response, nor is it necessary to add or modify equipment at the user terminal.

The above-discussed features, as well as additional features and advantages of the present invention, will become more readily apparent by reference to the following detailed description and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of an exemplary telecommunication system with flexible language selection capability in accordance with the present invention.

FIG. 2 is an exemplary call flow diagram showing flexible language selection in the system of FIG. 1 using the caller terminal CLI.

FIG. 3 is an exemplary call flow diagram showing flexible language selection in the system of FIG. 1 using a telephone system credit card.

FIG. 4 is a block diagram of an exemplary data communication system with flexible language selection capability in accordance with the present invention.

FIG. 5 is an exemplary flow diagram showing flexible language selection in the data communication system of FIG. 4.

DETAILED DESCRIPTION

The present invention provides a method and apparatus for flexible language selection in telecommunication systems. Although the following description is primarily directed to telephone and ATM network applications, it should be understood that the present invention may be used in other telecommunication systems and applications. It should also be understood that the particular equipment shown in the embodiments described may be replaced by other types of telecommunication equipment. For example, a variety of different storage means may be used herein to store a language selection indicator.

An exemplary telecommunication system for use in accordance with the present invention is shown in FIG. 1. The exemplary system shown is a telephone network providing voice communications between a caller and, for example, a subscriber to an 800 number service, hereinafter referred to as an 800 subscriber. The caller initiates a call from a caller terminal 10, which may be a telephone with a corresponding Plain Old Telephone Service (POTS) number. The call initiated at terminal 10 is routed to a central office 12, which may be a local

exchange switch within a local exchange carrier (LEC) network. The central office may be, for example, a 5ESS® Switching System, manufactured by American Telephone & Telegraph Co., Inc. (AT&T). Central office 12 directs the call to a switching network 14, which may be a long distance carrier network, an inter-exchange carrier (IXC) network, or an LEC network.

The exemplary switching network 14 includes a first service switching point (SSP) 16, a service control point (SCP) database 18, and a second SSP 22. Each of the SSPs 16, 22 may be a toll office with Common Channel Signalling (CCS) capability, such as the 4ESS® Switching System manufactured by AT&T. The CCS capability provides a high-speed packet-switched data link which may, for example, carry network control information to or from SCP database 18. Network control using CCS is described in, for example, U.S. Patent No. 4,162,377, entitled "Data Base Auto Bill Calling Using CCIS Direct Signaling," and U.S. Patent No. 4,277,649, entitled "Method and Apparatus for Screening Telephone Calls," both assigned to the assignee of the present invention and incorporated by reference herein. An exemplary type of CCS suitable for use in the present invention is CCS No. 7, also known as Signalling System 7 (SS7).

Alternatively, each of the SSPs 16, 22 may be inter-exchange switches in a long distance carrier or IXC network, or local exchange switches in an LEC network. Although SSP 16 is shown directly connected to SCP database 18, it should be understood that additional network equipment, such as a Signal Transfer Point (STP), which is not shown, may be used to establish a connection between SSP 16 and SCP database 18. As used herein, the term "SSP" refers to a telephone switching system which accesses an SCP database. However, it should also be understood that the language selection of the present

invention could be implemented in a telephone switching system without using an SCP database. For example, the language selection could be implemented in a central office or a toll office. The language selection indicator could then be stored in a translation table used to, for example, route calls to an appropriate operator or determine an appropriate announcement. The term "database" as used herein includes alternative central office and toll office storage means such as, for example, translation tables. The term "storage means" as used herein refers more generally to any type of storage mechanism used to store a language selection indicator.

Calls placed at caller terminal 10 are directed by central office 12 to first SSP 16. For certain types of calls, such as 800 service calls to an 800 subscriber, the first SSP 16 accesses the SCP database 18. The information within the SCP database 18 includes routing instructions which direct SSP 16 to route the incoming call in a particular manner. Generally, SCP database 18 will contain routing information for 700, 800, 900 or calling card service calls, while routing instructions for other types of calls, such as calls to a toll office operator, 411 information calls, or 911 emergency calls, may be stored or otherwise incorporated directly in a switching system. Calls made to a local operator by dialing "0" will be referred to herein as 0 calls, while calls made to a toll office operator by dialing "00" are referred to as 00 calls. Calling card service calls in which a telephone network is accessed by dialing "0" plus a destination POTS number will be referred to as 0+ calls. As noted above, routing instructions for operator information or emergency calls could be stored in the central office 12, or in a toll office, using a central or toll office database or other alternative storage means. The routing instructions for 0 calls are generally stored

in the central office 12, while instructions for 00 calls are stored in a toll office.

In the exemplary system of FIG. 1, the routing instructions stored within the SCP database 18 may, for example, direct SSP 16 to route an incoming 800 service call to the second SSP 22. SSP 22 may then route the call to a private branch exchange (PBX) 24, which establishes a connection to a subscriber terminal 26. The subscriber terminal 26 may be identified by its assigned Inward Wide Area Telephone Service (INWATS) number dialed from the caller terminal 10. INWATS 800 service is described in greater detail in U.S. Patent No. 4,191,860, entitled "Data Base Communication Call Processing Method," assigned to the assignee of the present invention and incorporated by reference herein. It should be noted that the PBX 24 could be replaced by a second central office. In either case, a voice connection is established between the terminals 10 and 26.

The routing instructions stored within SCP database 18 may alternatively direct SSP 16 to route an incoming call to a voice processing unit (VPU) 20, or to an appropriate operator, in order to provide interactive services to the caller. As used herein, the term "interactive services" includes any type of services provided to the caller, such as, for example, a single recorded announcement, a series of recorded prompting announcements, or interaction with a live operator. In the exemplary system of FIG. 1, VPU 20 provides a single recorded announcement, or a series of recorded prompting announcements, to the caller terminal 10 via SSP 16 and central office 12. The VPU 20 determines appropriate announcements for a particular caller using, for example, the number dialed from the caller terminal. The announcements may prompt the caller to provide information via voice or dual-tone multiple-frequency (DTMF) commands

which are detected in VPU 20 in a manner well-known in the art. The VPU 20 may be implemented using, for example, an Enhanced Services Complex (ESC), available from AT&T, and described in D. Fischell et al., "Interactive Voice Technology Applications," AT&T Technical Journal, Sept./ Oct. 1990, pp. 61-76. In prior art telephone systems, the caller may enter a voice or DTMF command, or dial different toll-free access numbers, in order to select an interactive service language. As noted above, the prior art systems are inefficient in that the caller selects a language each time network 14 is accessed, even though the caller's preferred language is unlikely to change from access to access.

The present invention avoids these and other problems of the prior art, in part by storing in, for example, the SCP database 18, a language selection indicator for each of a plurality of caller terminals. Upon receipt of an incoming call, SSP 16 accesses the SCP database 18 in order to determine a preferred language previously selected for caller terminal 10. The SSP 16 identifies a particular caller terminal 10 by a calling line identifier (CLI) associated with that terminal. In general, every POTS caller terminal has a unique CLI, which may be used to identify the individual, household or business using that terminal. SSP 16 provides the caller terminal CLI to a network database, such as SCP database 18, in a manner well-known in the art. Additional detail on CLI-based call processing may be found in, for example, U.S. Patent No. 4,277,649, cited above. The CLI is then used to locate, within SCP database 18, a language selection indicator for the caller terminal 10. The SCP database 18 may be accessed in this manner each time an incoming call is received from terminal 10. Alternatively, a language selection indicator for certain types of calls may be stored in other storage means, such as a translation table

in central office 12 or a toll office, to avoid accessing an SCP database for each call. The SCP database 18 provides the language indicator to VPU 20, such that subsequent interactive services are conducted in the selected language. The language indicator may be in the form of, for example, a three-digit code, with a different code for each language. Alternatives to the CLI for identifying a preselected language for a particular caller include telephone credit card numbers, to be discussed in greater detail below.

An interface unit (IFU) 28 within VPU 20 receives the language indicator from the SCP database 18 via SSP 16, and provides the language indicator to a time slot interchange unit 30. The time slot interchange unit places data and voice information in appropriate trunk time slots for transmission between SSP 16 and VPU 20, in a manner well-known in the art. A processor 32 receives the language indicator from time slot interchange unit 30, and directs an announcement unit 34 to provide the appropriate interactive services, corresponding to the number dialed from terminal 10, in the preselected language. Alternatively, IFU 28 could provide the language indicator directly to processor 32 via line 35. The language indicator may also enable a speech recognition unit (SRU) 36 to accept voice commands from the caller in the preselected language, in response to prompting announcements from announcement unit 34. Because the SCP database 18 may be accessed for each incoming call to SSP 16, the caller at terminal 10 need not reenter a language selection after an initial selection. VPU 20 may also include additional processing hardware, which is not shown, such as a tone detector for detecting DTMF commands, and one or more databases for storing announcements and other interactive service information. The operation of the processing hardware in

VPU 20 is well-known in the art, and therefore will not be further described. For additional detail see, for example, U.S. Patent No. 4,827,500, entitled "Automatic Speech Recognition to Select Among Call Destinations," assigned to the assignee of the present invention and incorporated by reference herein.

An exemplary call flow diagram for the system of FIG. 1 is shown in FIG. 2. A caller at caller terminal 10 initiates the call flow by dialing a special service number, as indicated in operation block 200. As used herein, the term "special service number" refers to any dialed number for which interactive services are provided to the caller, such as 0, 00, 0+, 411, 911, and 700, 800 or 900 service numbers. The special service number dialed is then processed in operation blocks 202 through 206. The CLI of the telephone line to which terminal 10 is connected is sent to the particular network element, such as SSP 16 or SCP database 18, which contains the routing instructions for the number dialed. As noted above, the routing instructions for certain numbers, such as 700, 800, 900 and 0+ service numbers, are typically stored within SCP database 18. The routing instructions for other numbers, such as 0, 00, 411, and 911, may be contained in a database or other storage means within a central office or a toll office. The CLI of the caller terminal 10 is used to locate routing instructions in the appropriate storage means, as indicated in operational block 202. The CLI is also used to locate, in the appropriate storage means, an indicator of the language previously selected for calling terminal 10. The VPU 20 uses the language indicator to determine a language for subsequent interactions with the caller, as shown in block 206.

Alternatively, the language indicator for a particular CLI could be used to direct the incoming call

to an operator familiar with the selected language. For example, depending upon the language selected by a particular caller, a 411 or 911 call could be routed to an operator who speaks the caller's language. If a single operator understands multiple languages, the language selection could be displayed so the operator knows which language to use. All subsequent interactive services are then provided, by the operator, in the selected language identified by the caller terminal CLI. Because the CLI is specific to the caller terminal 10, rather than a particular caller, an initial announcement may be played in a well-known language, such as English, notifying the callers that a previously selected language may be changed at any time, by specific entry or a default key entry, to the well-known language or another selected language. In this manner, callers unfamiliar with the language previously selected for a particular caller terminal will not be delayed in making, for example, an emergency 911 call in a different language. At the end of a particular access to network 14, the call flow returns via return path 208 to the beginning of the sequence such that upon a caller's next access to the system, the terminal CLI will again be used to identify the appropriate preselected language.

As noted above, other user identifiers may be used to locate stored information regarding the language preference of a particular caller. For example, a caller may use a telephone credit card to access certain telephone networks, and the card number may be used as a user, or caller, identifier. The calling card service provided by AT&T is accessed in this manner, using a number from a telephone credit card. The telephone credit card is also known as a calling card. In this embodiment of the present invention, the caller identifier is specific to the caller, rather than to the calling

terminal 10. Therefore, by using the card, a caller may be provided with interactive services in his or her selected language from any caller terminal. Card-based language selection may thus be preferred in applications in which CLI-based language selection may be inappropriate, such as in airport pay telephones which service a diverse group of users. FIG. 3 is a call flow diagram illustrating flexible language selection with a credit card number as a user identifier. The basic operation of telephone credit card systems is well-known in the art, and described in, for example, U.S. Patent No. 4,162,377, cited above.

The typical call flow for card-based language selection in the system of FIG. 1 is illustrated in operational blocks 300 through 306 of FIG. 3. Initially, to access the telephone system, a caller passes a card through a card reader at a caller terminal 10, which may be a public telephone in this embodiment. Alternatively, the caller may enter the card number at terminal 10 using, for example, voice or DTMF commands. The card number is sent via SSP 16 to a network database, such as SCP database 18. Within the database 18, the card number is used to identify a language previously selected by the caller. The SCP database 18 thus includes a number of stored language selections, each of the selections corresponding to a particular card number. The database 18 provides a selected language indicator to, for example, VPU 20. The language indicator may be used to direct announcement unit 34 to play the appropriate announcements in the preselected language, as described above. In the credit card case, these announcements may include, for example, an announcement prompting the caller to enter a personal identification number (PIN). Alternatively, the language indicator may be used to direct the incoming call to an operator familiar with the preselected language.

All subsequent interactive services are thus performed in the preselected language, without any additional selection from the caller, as indicated in operational block 306. After the completion of a particular system access, the call flow sequence in operational blocks 300 to 306 is typically repeated for each subsequent access, as indicated by return path 308.

In an alternative embodiment of card-based flexible language selection, the language selection indicator could be stored in, for example, a magnetic strip on the telephone credit card itself. The magnetic strip is read in a card reader at the caller terminal, and subsequent interactive services are provided in the preselected language. The user identifier is the credit card itself, which stores a language selection indicator for the card's user. The credit card could incorporate alternative storage means, such as an electronic memory, in place of the magnetic strip.

In either the CLI-based or card-based embodiments of flexible language selection described above, the caller may initially establish a selected language in a number of different ways. For example, upon an initial access to the system, the caller may be prompted to enter a desired language from the caller terminal 10 via a voice, DTMF or other command. The command could be recognized in SRU 36 or a tone detector, respectively, and converted to a language indicator which could be stored within SCP database 18. The system could be alerted to an initial system access when, for example, SCP database 18 is accessed but no language indicator is found for the CLI or card number. The CLI could also be used to identify caller terminals, such as public pay telephones, which usually have many different users and therefore may not be appropriate for CLI-based language preselection. Once an indicator is stored for a particular terminal CLI or

credit card number, it will generally not be necessary to prompt the caller using the corresponding terminal or card to select a language on subsequent accesses. Although in most applications a user will not want to change a language selection very often, certain voice or DTMF commands may be reserved for selecting a new language at any time during system access. For example, a unique DTMF command could be generated at the caller terminal, using a Touch-Tone key entry such as "*" or "#", to notify the VPU 20 that a caller wants to change the selected language. The VPU 20 then prompts the caller with an announcement indicating the available languages, detects a voice or DTMF response, converts the response to a language indicator, and sends the language indicator to SCP database 18 for storage. Alternatively, a user could select a language when filling out initial paperwork to obtain the terminal or card.

In an alternative embodiment of the present invention, the language indicator for a particular terminal CLI or caller credit card number could be determined by recognizing, in SRU 36, the language spoken by the caller. Once the language is determined, all interactive services for the call are provided in the appropriate language. A language indicator may then be stored, in a manner described above, such that any future calls using that caller terminal or card number also receive interactive services in the appropriate language. The SRU 36 could be directed to recognize the language spoken on an incoming call when, for example, there is no stored language indicator corresponding to the terminal CLI or card number.

As previously mentioned, the flexible language selection of the present invention is not limited to use in telephone systems, but may also be implemented in other telecommunication systems, such as the data communication

network of FIG. 4. The exemplary data communication network shown includes a plurality of user terminals, in the form of automatic teller machines (ATMs), which are interconnected with a database at a financial institution. The present invention may also be used with a wide variety of other data networks such as those used in, for example, credit card purchase authorization and telemarketing applications. In this embodiment, ATMs 400, 402 are interconnected via modems 404, 406, respectively, telephone network 408, and modem pool 410, to a wide area network (WAN) 412. Although only two ATMs are shown for illustrative purposes, it should be understood that an ATM network will generally include many additional ATMs. The modems 404, 406 link the individual ATMs 404, 406 to telephone network 408. The modem pool 410 connects the modems 404, 406, and modems attached to other system ATMs, to WAN 412. Alternatively, the modems 404, 406, telephone network 408, and modem pool 410 may be replaced by, for example, an X.25 data communication link.

An exemplary WAN is the InterSpan℠ Frame Relay Service, available from AT&T. The LAN 418 may be a StarLAN, also available from AT&T. Although a data communication network may include several LANs, for clarity only a single LAN 418 is shown in FIG. 4. The LAN 418 interconnects a database 420, and other databases which are not shown, to the WAN 412. The database 420 may be maintained within, for example, an NCR model 3300 computer at the main branch of a bank or credit union. The data communication system thus provides user account information, stored in databases at various financial institutions, to the user terminals, or ATMs, which access the stored account information to service the users.

The data communication network of FIG. 4 may incorporate flexible language selection in the following manner. A language selection made by a particular user is

stored within database 420 at, for example, the user's bank or credit union. Each time that user accesses one of the ATMs 400, 402 within the system to which database 420 is connected, a user identifier is provided from the ATM, through the previously described system hardware, to database 420. The user identifier may be encoded on a magnetic strip on an access card which is read in a card reader at the ATM. Within database 420, the user identifier is used to access a previous language selection made by that user. An indicator of the language preselected by a particular user is transmitted back through LAN 418, WAN 412, telephone network 408, one of the modems 404, 406, to the ATM 400, 402 through which the user is accessing the system. The ATMs include electronic hardware, developed using techniques well-known in the art, which utilizes the language indicator transmitted from database 420 to determine in which of a number of available languages the user should be prompted. In the ATM context, interactive services are typically provided in the form of one or more information screens displayed to the user, from which various service options may be selected. These subsequent interactive services provided at ATMs 400, 402 are conducted in the selected language of the user, as stored in database 420. With this arrangement, the user's time is not wasted by repeatedly asking the user to enter a desired language, when the user may have previously accessed the network hundreds of times and always selected the same language. The user may also be given the opportunity to change the preselected language, for example, by providing an announcement on the ATM screen during idle time.

An exemplary flow diagram illustrating flexible language selection in the data communication network of FIG. 4 is shown in FIG. 5. The flow sequence is illustrated in operational blocks 500 through 506.

Initially a user passes a card through a card reader at one of the ATMs 400, 402. The user identifier, stored in a magnetic strip on the card, is read by the card reader and sent through one of the modems, 404, 406, the modem pool 410, WAN 412, and LAN 418 to database 420 in the manner previously described. The database 420 uses the card number to determine a language previously selected by that user. A language indicator corresponding to the preselected language is transmitted back through the data communications network to the ATM. The ATM is directed by the language indicator to conduct all subsequent interactive services in the preselected language. The user then terminates his access to the ATM after receiving the desired services. Upon the user's next access to a network ATM, the sequence shown in operational blocks 500 through 506 is repeated, as indicated by the return path 508.

The data communication system in FIG. 4 may also initially prompt a system user to select from a number of available languages. An initial user access to one of the system's ATMs may be detected when, for example, database 420 is accessed but no language indicator is found for that user. The database 420 could then return a signal to the accessed ATM indicating that the current user has not yet selected any particular system language for interactive services. The ATM then prompts the user to select one of a number of available system languages. The user's response is then converted to a language indicator, transmitted through the network, and stored within database 420, along with the user identifier, such that the selected language may be used each time the user accesses the system. Alternative techniques could also be used for determining an initial user language selection. For example, when initially filling out paperwork to obtain an access card, a user could be asked to indicate

their language preference. The language preference is then stored along with the user identifier in database 420 at the time the user account is established.

In another alternative embodiment of the present invention, the storage means which contains the language selection indicator could be, for example, the magnetic strip on the access card, rather than database 420. The user identifier is the access card itself, which stores a language indicator for the card's user. The access card, when read in the card reader, thus identifies the user and an appropriate preselected language. It is then no longer necessary to access database 420 to find the language selection indicator for a particular user. The user may, for example, change the language selection at the bank or the user terminal by using equipment capable of storing information on the magnetic strip. The access card could incorporate alternative storage means, such as an electronic memory, in place of the magnetic strip. The use of an access card with electronic memory may facilitate storage of a new language selection at a user terminal.

Although the foregoing detailed description has described the present invention primarily in terms of particular language selection applications, it should be emphasized that the embodiments discussed are exemplary only. Many variations may be made in the arrangements shown, including, for example, the type of telecommunication system in which the flexible language selection is implemented, the storage means used to store the language selection indicator, and the type of user identifier. These and other alternatives and variations will be readily apparent to those skilled in the art, and the present invention is therefore limited only by the appended claims.

CLAIMS:

1. A method of providing interactive telecommunication services, comprising the steps of:

storing, in a telecommunication system storage means, a language selection indicator for a particular system user;

identifying said language indicator stored in said storage means, upon access to said system by said user, using a user identifier corresponding to said system user; and

providing said interactive services to said user in a language corresponding to said language selection indicator.

2. The method of claim 1 further including the steps of:

prompting said user to select one of a number of available system languages upon an initial user access to said system;

generating said language selection indicator from a selection of said user; and

storing said language selection indicator with said user identifier in said storage means.

3. The method of claim 1 further including the steps of:

receiving in a speech recognition unit voice commands from said user;

recognizing a language of said voice commands as one of a number of available system languages;

generating a language selection indicator corresponding to said recognized language; and

storing said language selection indicator in said storage means.

4. The method of claim 1 wherein said step of storing said language selection indicator in said storage means includes storing said language selection indicator in a telephone network database.

5. The method of claim 1 wherein said step of storing said language selection indicator in said storage means includes storing said language selection indicator in a translation table in a local exchange switch.

6. The method of claim 1 wherein said step of storing said language selection indicator in said storage means includes storing said language selection indicator in a translation table in a toll office switch.

7. The method of claim 1 wherein said step of storing said language selection indicator in said storage means includes storing said language selection indicator in a long distance carrier network database.

8. The method of claim 4 further including the steps of:

receiving a call from a caller accessing a telephone line of said telephone network;

routing said call from a central office to a first network switch;

providing a calling line identifier, identifying said telephone line of said caller, from said first network switch to said network database; and

accessing said network database with said calling line identifier to determine said language selection indicator of said caller on said telephone line.

9. The method of claim 8 further including the steps of:

providing said selected language indicator to a voice processing unit within said network;

processing said language selection indicator in said voice processing unit to determine an appropriate announcement to be made to said caller as part of said interactive services; and

providing said announcement to said caller.

10. The method of claim 9 further including the step of routing a voice command from said caller to an appropriate speech recognition unit, identified by said language selection indicator, in order to properly detect said voice command.

11. The method of claim 1 wherein said telecommunication system is a telephone network and said user identifier is a telephone credit card number.

12. The method of claim 11 wherein said storage means is a telephone network database.

13. The method of claim 12 further including the steps of:

receiving, in a processing unit in said telephone network, said card number after said number is transmitted from said user terminal to said network;

providing said card number to said telephone network database; and

locating said language selection indicator stored in said telephone network database using said card number.

14. The method of claim 1 wherein said telecommunication system is a data communication network having a plurality of user terminals.

15. The method of claim 14 wherein said storage means is a data communication network database.

16. The method of claim 15 further including the steps of:

reading said user identifier from an access card in a card reader at one of said user terminals;

providing said user identifier to said data communication network database; and

determining said selected language based upon said language selection indicator stored in said data communication network database and identified by said user identifier.

17. The method of claim 14 wherein said storage means is incorporated into an access card used to access a user terminal of said network.

18. The method of claim 1 wherein said storage means is incorporated into a telephone credit card used to access said telecommunication system.

19. A telecommunication system comprising:

storage means for storing a language selection indicator for a particular system user;

means for identifying said language selection indicator stored in said storage means, upon access to said system by said user, using a user identifier corresponding to said user; and

means for providing interactive services to said user in a language corresponding to said language selection indicator.

20. The system of claim 19 wherein said user selects from one of a number of available system languages upon an initial access to said system, and said language selection indicator is generated from a selection of said user and stored with said user identifier in said storage means.

21. The system of claim 19 wherein said system includes a telephone network and said storage means is a telephone network database.

22. The system of claim 21 further including:

a central office for receiving a call from a caller accessing a telephone line of said telephone network, said telephone line identified by a calling line identifier; and

a first network switch for receiving said call from said central office, and providing said calling line identifier to said network database, such that said calling line identifier may be used to locate said language selection indicator stored in said database.

23. The system of claim 22 further including:

a processor for receiving and processing said selected language indicator from said database to determine an appropriate announcement to be made to said caller as part of said interactive services; and

an announcement unit for providing said announcement to said caller.

24. The system of claim 22 further including a speech recognition unit for detecting a voice command from said user in said selected language.

25. The system of claim 19 wherein said telecommunication system is a telephone network and said user identifier is a telephone credit card number.

26. The system of claim 25 further including:

a card reader at said user terminal for reading said card number from a card;

a central office for receiving said card number; and

a first network switch for receiving said card number from said central office, and providing said card number to a network database, such that said card number may be used to locate said language selection indicator stored in said database.

27. The system of claim 19 wherein said telecommunication system is a data communication network having a plurality of user terminals.

28. The system of claim 27 wherein said storage means is a data communication network database.

29. The system of claim 28 further including:

a card reader at each of said user terminals for reading said user identifier from an access card; and

a communication link between said system database and each of said user terminals over which said user identifier may be transmitted to said network database, and over which said language selection indicator stored in said network database and identified by said user identifier may be transmitted to said user terminal.

30. The system of claim 27 wherein said storage means is incorporated into an access card used to access a user terminal of said network.

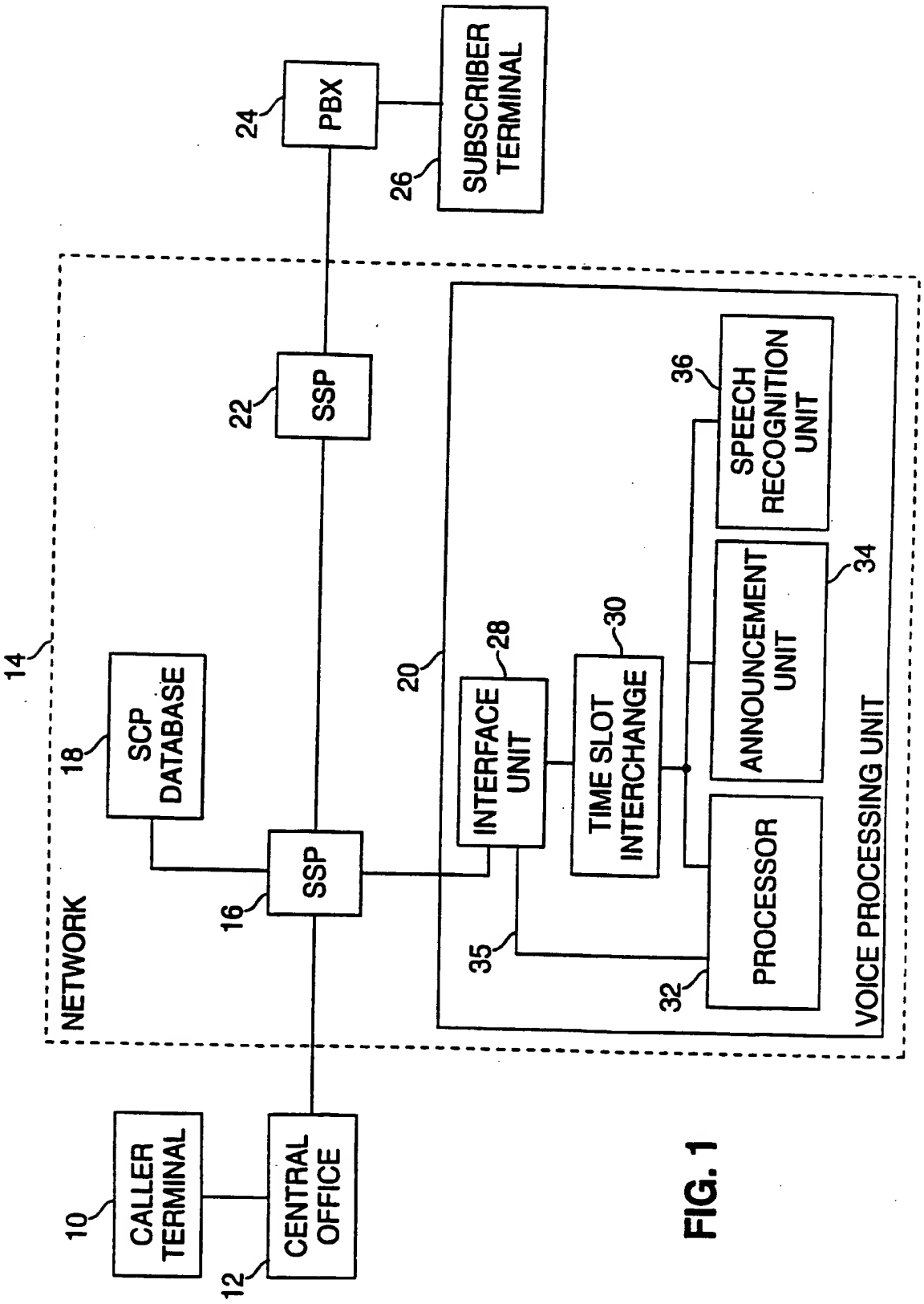
CALLER TERMINAL
10
CENTRAL OFFICE
12
NETWORK
14
SCP DATABASE
18
SSP
16
SSP
22
PBX
24
SUBSCRIBER TERMINAL
26
20
INTERFACE UNIT
28
TIME SLOT INTERCHANGE
30
SPEECH RECOGNITION UNIT
36
ANNOUNCEMENT UNIT
34
PROCESSOR
32
35
VOICE PROCESSING UNIT

FIG. 1

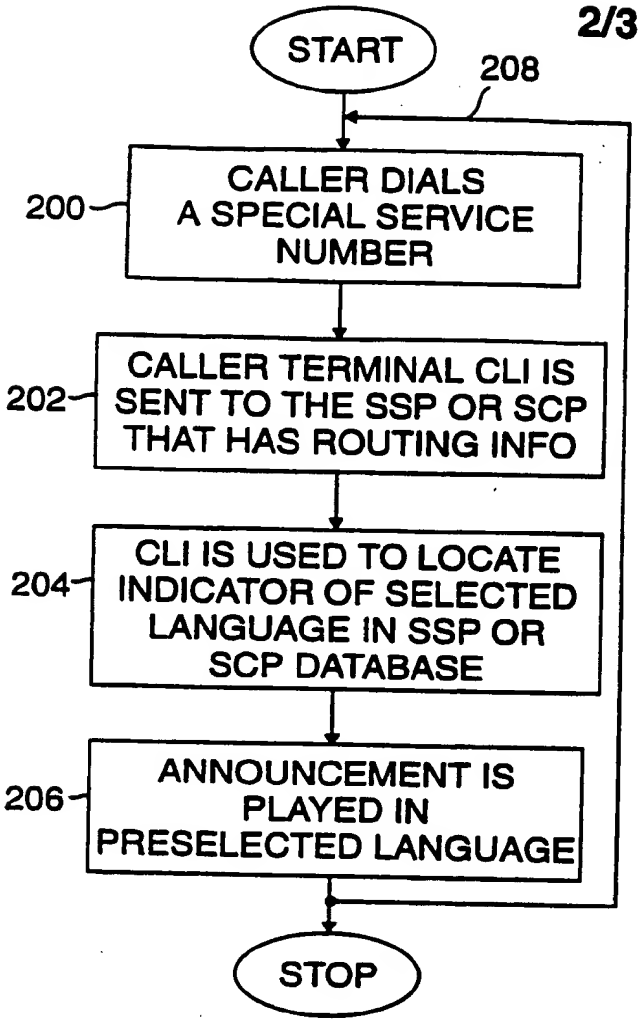
START
208
200
CALLER DIALS A SPECIAL SERVICE NUMBER
202
CALLER TERMINAL CLI IS SENT TO THE SSP OR SCP THAT HAS ROUTING INFO
204
CLI IS USED TO LOCATE INDICATOR OF SELECTED LANGUAGE IN SSP OR SCP DATABASE
206
ANNOUNCEMENT IS PLAYED IN PRESELECTED LANGUAGE
STOP

FIG. 2

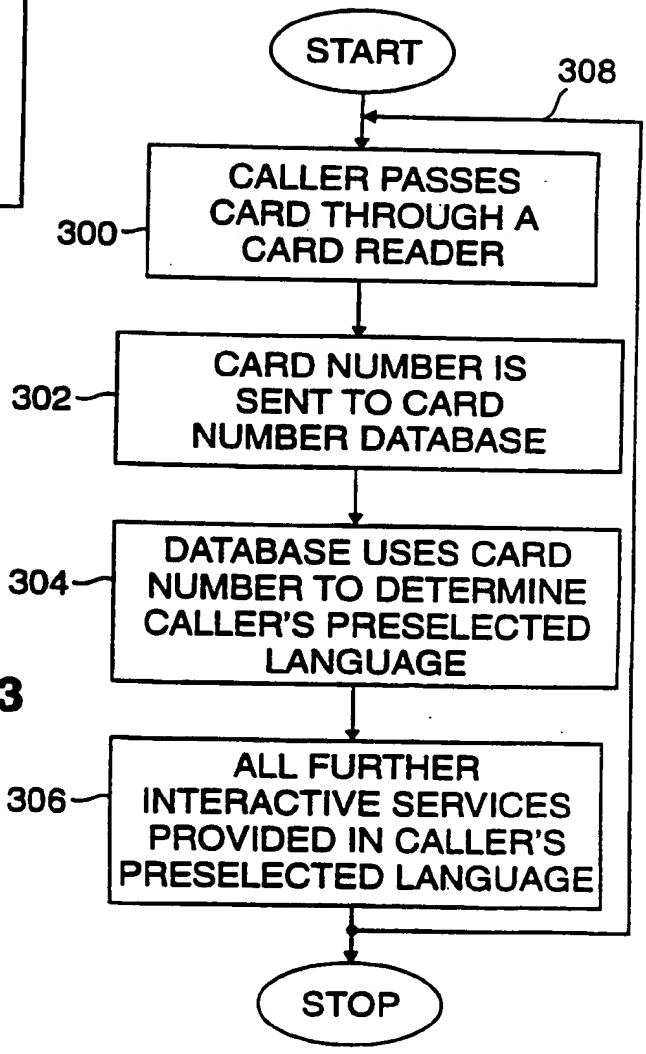
START
308
300
CALLER PASSES CARD THROUGH A CARD READER
302
CARD NUMBER IS SENT TO CARD NUMBER DATABASE
304
DATABASE USES CARD NUMBER TO DETERMINE CALLER'S PRESELECTED LANGUAGE
306
ALL FURTHER INTERACTIVE SERVICES PROVIDED IN CALLER'S PRESELECTED LANGUAGE
STOP

FIG. 3

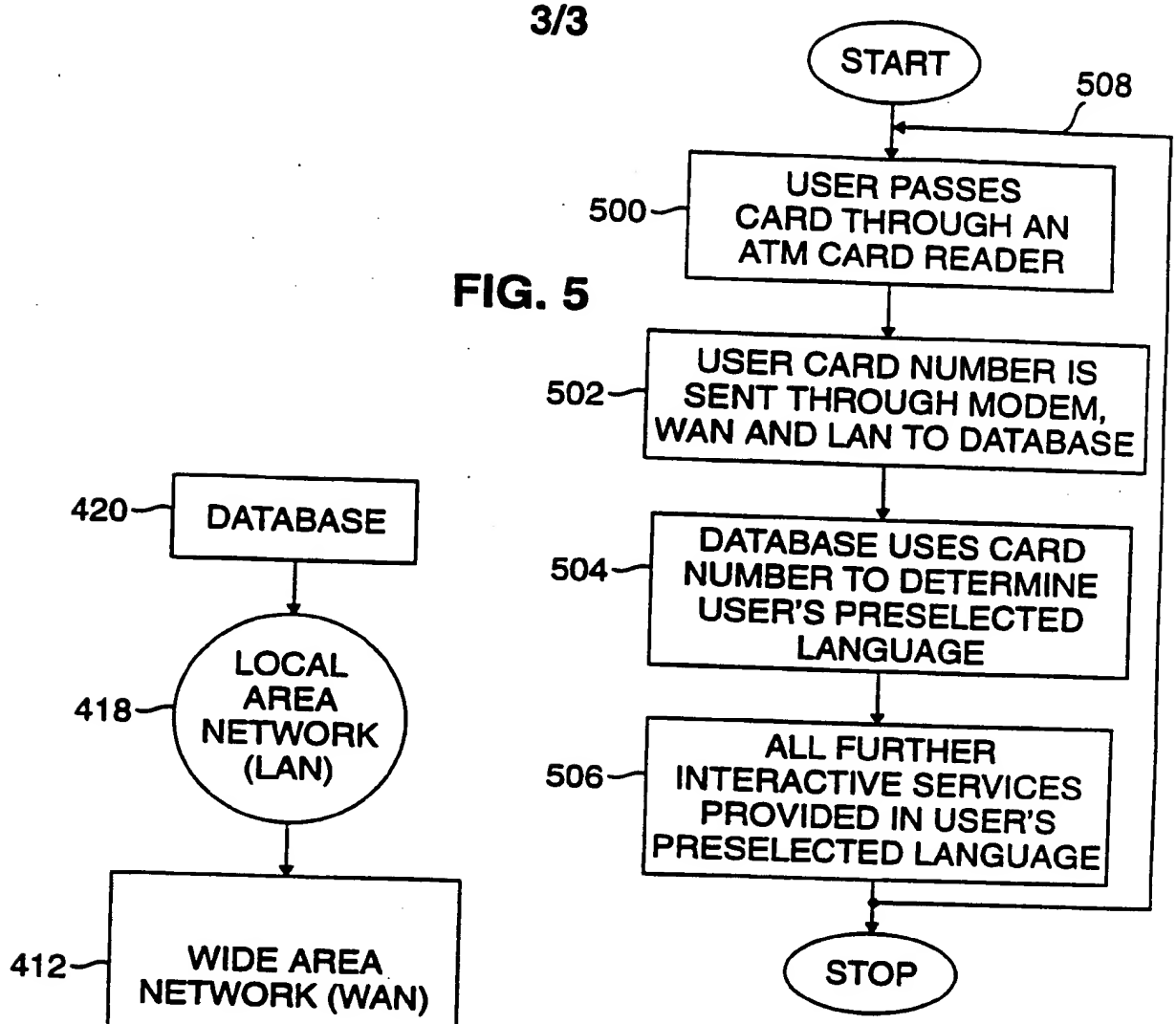
START
508
500
USER PASSES CARD THROUGH AN ATM CARD READER
502
USER CARD NUMBER IS SENT THROUGH MODEM, WAN AND LAN TO DATABASE
504
DATABASE USES CARD NUMBER TO DETERMINE USER'S PRESELECTED LANGUAGE
506
ALL FURTHER INTERACTIVE SERVICES PROVIDED IN USER'S PRESELECTED LANGUAGE
STOP

FIG. 5

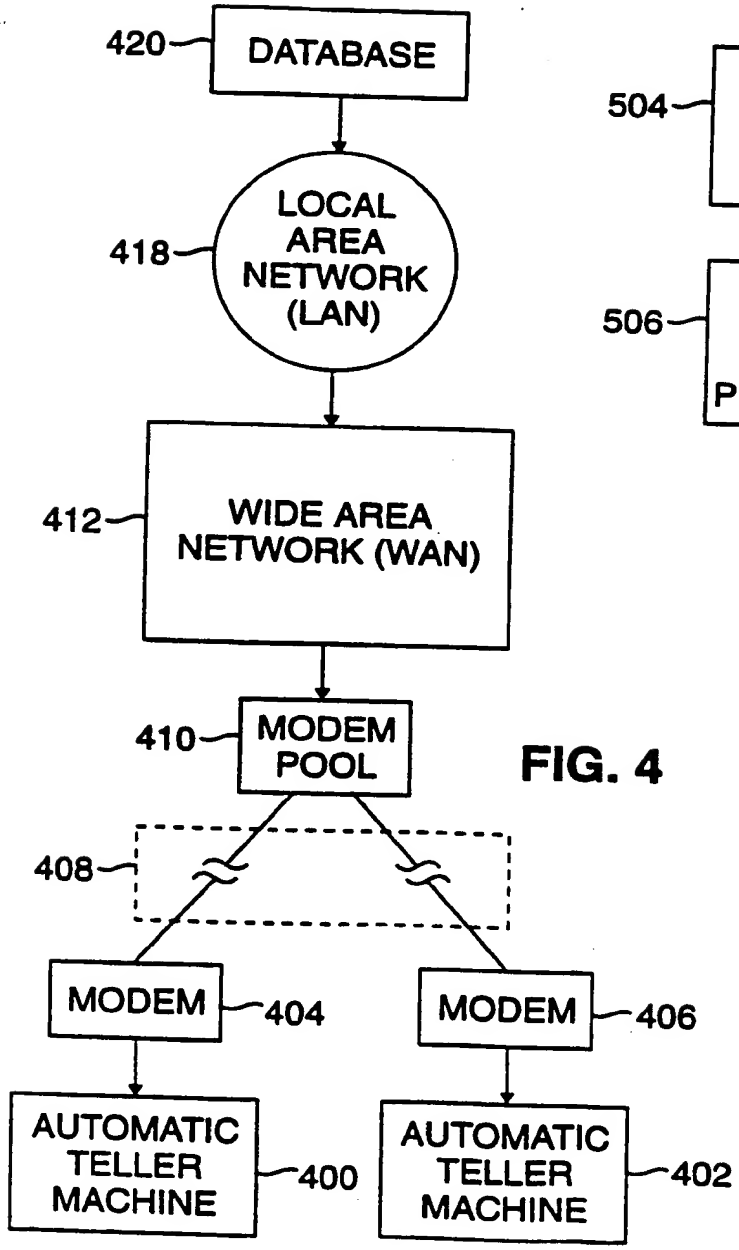
420
DATABASE
418
LOCAL AREA NETWORK (LAN)
412
WIDE AREA NETWORK (WAN)
410
MODEM POOL
408
MODEM
404
MODEM
406
AUTOMATIC TELLER MACHINE
400
AUTOMATIC TELLER MACHINE
402

FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US94/14535

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :H04M 3/50, 3.42
US CL :379/67, 88

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 379/67, 88, 89

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS, STN
search terms: language, multilingual, speech recognition, credit or ATM or calling card, voice prompt

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US, A, 4,736,405 (AKIYAMA) 05 April 1988, Figures 1, 3, and 6 and column 3 lines 25-29.	1, 14, 17, 19, 27, and 30 --- 18
X, P	US, A, 5,297,183 (BAREIS ET AL.) 22 March 1994, Figure 5, column 6 lines 14-25 and column 11 lines 42-54.	1, 4, 8-10, 21-24.
Y, P	US, A, 5,329,578 (BRENNAN ET AL.) 12 July 1994, column 8 line 8 (table 5) and column 8 lines 34-35.	1-9, 11-16, 19-23, 25-26, 28-29
Y	US, A, 4,866,755 (HASHIMOTO) 12 September 1989, abstract, figures 1 and 4	3

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be part of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 15 FEBRUARY 1995	Date of mailing of the international search report 21 APR 1995
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer DANIEL HUNTER Telephone No. (703) 308-6732

Form PCT/ISA/210 (second sheet)(July 1992)*

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US94/14535

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 5,236,199 (THOMPSON, JR) 17 August 1993, column 5 lines 15-20.	11-16, 25, 26, 28, 29
Y	DE, C, 3,405,448 (KLEMENT) 14 August 1985, abstract	14-16, 28-29